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TITLE : HIGH STRENGTH COPPER ALLOY WITH RESISTANCE TO HEAT AND WEAR, AND ITS PRODUCTION

ABSTRACT : PROBLEM TO BE SOLVED: To improve electric conductivity, hardness at high temp., and wear resistance without deteriorating mechanical strength by adding nickel in the amount nearly equal to the amount of aluminum to aluminum bronze and applying solution heat treatment and aging treatment.

SOLUTION: Alloy, having a composition consisting of, by weight ratio, 3.5-5.0% Ni, 0.5-2.0% Si, 3.0-5.5% Al, 0.5-2.5% Fe, 0.5-1.5% Mn, and the balance Cu with inevitable impurities, is used. After this alloy is subjected to pressure die casting or this alloy is cast into ingot and then hot-forged, solution heat treatment and aging treatment are applied at 850-970°C and at 600°C, respectively, by which a fine structure in which nickel silicide is dispersedly precipitated is formed. By this method, the mechanical and physical properties, aiming at $\geq 6.35\text{N/mm}^2$ tensile strength, $\geq 5\%$ elongation, $\geq 95\text{HB}$ hardness at ordinary temp., $\geq 60\text{HB}$ hardness at 600°C, $\geq 10\%$ IACS electric conductivity, and a wear resistance superior to that of ABB-2 material, can be obtained.

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